

CLAIMS

What is claimed is:

1. A fluid apparatus having a pump and an accumulator,

5 wherein

said pump (P) comprises, in a pump body (1), a pump inflow passage (5), a pump outflow passage (6), and a pump bellows (7),

10 said pump bellows (7) has an axis (B), and is extend-  
ingly and contractingly deformable in a direction of said axis (B),

a pump liquid chamber (9) is formed inside said pump bellows (7),

15 a suction port (18) and a discharge port (19) are  
formed in a wall face (4a) of said pump body (1) facing  
said pump liquid chamber (9), said suction port (18) commu-  
nicating with said pump inflow passage (5), said discharge  
port (19) communicating with said pump outflow passage (6),

20 a suction check valve (20) is disposed in said suction  
port (18),

a discharge check valve (21) is disposed downstream  
from said pump outflow passage (6),

25 said accumulator (A) comprises, in an accumulator body  
(25), an accumulator inflow passage (33), an accumulator  
outflow passage (34), and an accumulator bellows (29),

said accumulator bellows (29) has an axis (C), and is extendingly and contractingly deformable in a direction of said axis (C),

an accumulator liquid chamber (31) is formed inside  
5 said accumulator bellows (29),

an inflow port (23) and an outflow port (24) are formed in a wall face (28a) of said accumulator body (25) facing said accumulator liquid chamber (31), said inflow port (23) communicating with said accumulator inflow pas-  
10 sage (33), said the outflow port (24) communicating with said accumulator outflow passage (34),

said accumulator inflow passage (33) is connected to a downstream of said pump outflow passage (6), and

said discharge check valve (21) of said pump (P) is  
15 disposed in said accumulator inflow passage (33).

2. The fluid apparatus having a pump and an accumulator according to claim 1, wherein

said discharge check valve (21) of said pump (P) is  
20 placed in said inflow port (23) which is formed in a downstream end of said accumulator inflow passage (33).

3. The fluid apparatus having a pump and an accumulator according to claim 2, wherein

25 said discharge check valve (21) disposed in said in-

flow port (23) comprises a valve casing (220), and said valve casing (220) is formed to protrude from said wall face (28a) in which said inflow port (23) of said accumulator body (25) is formed, into said accumulator liquid chamber (31).

4. The fluid apparatus having a pump and an accumulator according to claim 3, wherein

said valve casing (220) comprises an outlet (226) through which an interior of said valve casing (220) communicates with said accumulator liquid chamber (31), and said outlet (226) is opened in an tip end of said valve casing (220) or a vicinity of said tip end, said valve casing protruding into said accumulator liquid chamber (31).

15

5. The fluid apparatus having a pump and an accumulator according to claim 1, wherein

each of said suction check valve (20) and said discharge check valve (21) comprises: a cylindrical valve casing (201, 220); a valve seat (211, 213, 230, 232); and a valve element (202, 221) which is inserted into said valve casing (201, 220), and said valve element (202, 221) is urged by valve closing urging means to be closely contacted with said valve seat (211, 213, 230, 232), thereby preventing liquid from reversely flowing.

6. The fluid apparatus having a pump and an accumulator according to claim 5, wherein

5 said valve closing urging means is configured by own weight of said valve element (202, 221).

7. The fluid apparatus having a pump and an accumulator according to claim 5, wherein

10 said valve closing urging means is configured by a valve closing spring (62, 63) inserted into said valve casing (201, 220).

8. The fluid apparatus having a pump and an accumulator according to claim 1, wherein

15 said axis (B) of said pump bellows (7) defines a vertical axis,

said discharge port (19) of said pump (P) is disposed in an inner bottom face (4a) of said pump body (1), and

20 said inner bottom face (4a) is formed into a shape in which said face is downward inclined as moving toward said discharge port (19).

9. The fluid apparatus having a pump and an accumulator according to claim 1, wherein

25 said axis (C) of said accumulator bellows (29) defines

a vertical axis,

said outflow port (24) of said accumulator (A) is disposed in an inner bottom face (28a) of said accumulator body (25), and

5        said inner bottom face (28a) is formed into a shape in which said face is downward inclined as moving toward said outflow port (24).

10        10. The fluid apparatus having a pump and an accumulator according to claim 9, wherein

said axis (B) of said pump bellows (7) defines a vertical axis,

said discharge port (19) of said pump (P) is disposed in an inner bottom face (4a) of said pump body (1), and

15        said inner bottom face (4a) of said pump body (1) is formed into a shape in which said face is downward inclined as moving toward said discharge port (19).